Grading for Self-Efficacy in CS1:
Policies, Framing, Adoption, and Design

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Study 1: Policies

What grading *policies* can be used in introductory CS courses to foster the greatest self-efficacy for novice programmers?

Research Goals
- Develop a framework of grading policies used in CS classrooms.
- Determine the best grading practices to support student self-efficacy.

Methods
- Multi-institutional analysis of syllabus documents and "syllabus day" overview lectures
- Collect self-efficacy questionnaire data from students under different grading policies.

Study 2: Framing

What grade *framing strategies* can be used in introductory CS courses to foster the greatest self-efficacy for novice programmers?

Research Goals
- Develop a framework of *framing* and presentation of grading policies used in CS classrooms.
- Determine the best *grade framing* practices to support student self-efficacy.

Methods
- Multi-institutional analysis of syllabus documents and "syllabus day" overview lectures
- Collect self-efficacy questionnaire data under different grading policies

Study 3: Adoption

What factors encourage or prevent the *adoption* of the identified "best practices" by CS faculty members?

Research Goals
- Identify instructors' reasons for adopting or choosing not to adopt the identified "best practices."
- Generate design ideas for implementation in Study 4.

Methods
- Multi-institutional interview study with introductory CS instructors
- Blue-sky thinking and other UX design activities

Study 4: Design

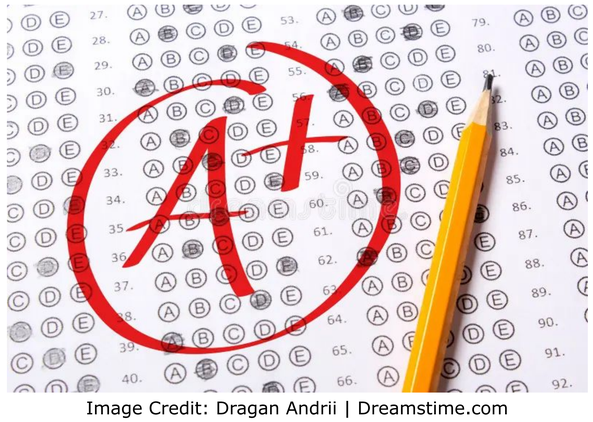
How can we *design* resources and*/*or tools to enable the use of these best practices, while maximizing ease of adoption by faculty, transparency for students, and equitable grading outcomes?

Research Goals
- Produce resources, tools, and/or prototypes to facilitate the adoption of best practice grading policies and framing strategies.

Methods
- Iterative design process with both introductory CS instructors and students

Motivation

- Mastery learning and other grading methodologies have received **recent attention** from the CS education community amongst the rise of "grading for equity."
- However, CS education literature overwhelmingly focuses on **grade outcomes and reported student satisfaction** with the system.
- Self-efficacy has long been empirically linked to **student persistence** in CS education, especially for underrepresented populations in computing.
- Studies in other STEM fields have shown ties between alternative grading methodologies and self-efficacy; it has not yet been established that a similar link exists in computing.



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Seeking Advice...

- Are you familiar with similar research? What **other approaches** would you take?
- How might the rising use of **LLMs** inform this research? How might this research inform the use of LLMs?
- Looking for external committee members!